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# Clinical Assessment of Anti-Aging Benefits of a Skincare Formulation: a biomarker-centered approach to antioxidative defense


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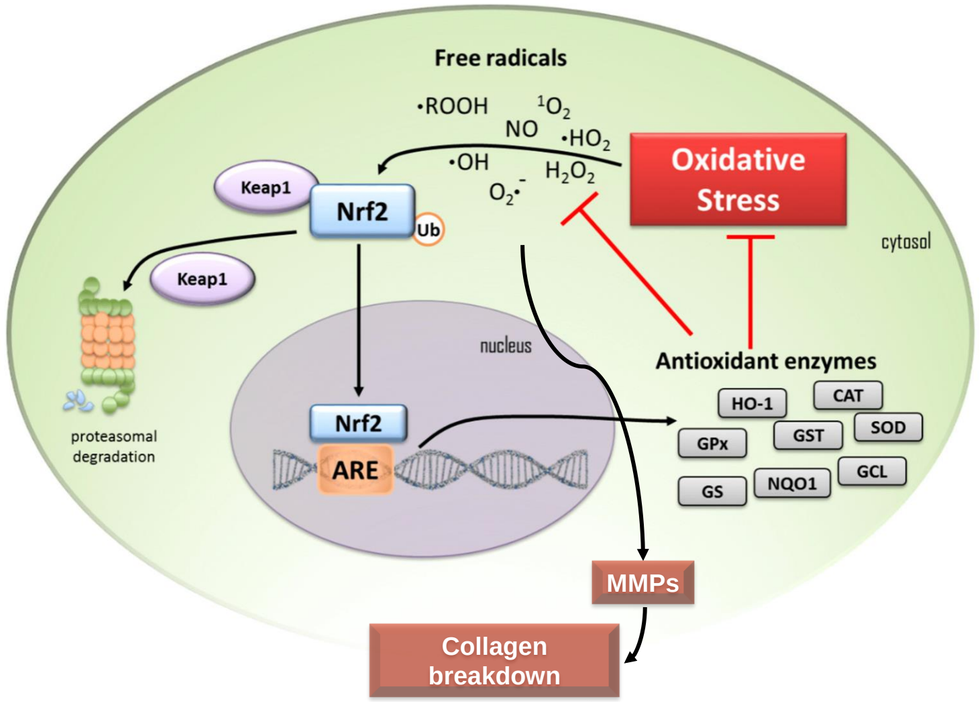
# BACKGROUND




*Francisqueti-Ferron FV, Ferron AJT, Garcia JL, et al. Int J Mol Sci. 2019;20(13):3208.*

- Skin homeostasis requires a balance between free radical production and natural antioxidant defense.
- Oxidative process is dynamic and rapid restoration mechanisms are necessary to maintain the structural integrity of the skin.
- NRF2 (Nuclear Factor Erythroid 2-related factor 2) is considered the key regulator antioxidant response, being responsible for induce the expression of genes encoding proteins and antioxidant enzymes, playing an important mechanism for cell protection and survival.
- Among NRF2 target genes are superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx).

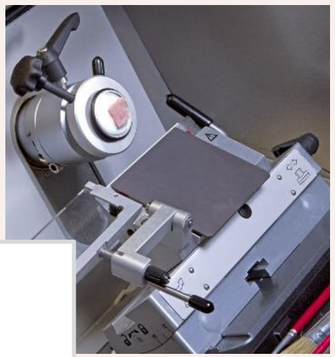
## OBJECTIVES

This study aimed to clinically evaluate the effects of skincare formulation (F4565.33367.200.1) on the production of NRF2, SOD, CAT, GPx and procollagen type I (pCOL1) in skin biopsies by immunofluorescence analysis.

# METHODS

**F4565.33367.200.1 formulation** was applied to the right forearm of research participants (n=9, 46±5y, ethics committee approval nº 5.039.071). Left forearm was considered a control site.

Ferulic acid, tocoferol, ascorbic acid and extracts of *Inga edulis*, *Theobroma cacau* and *Casearia sylvestris*

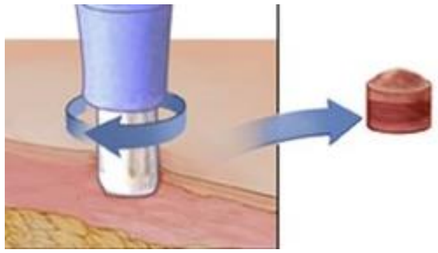


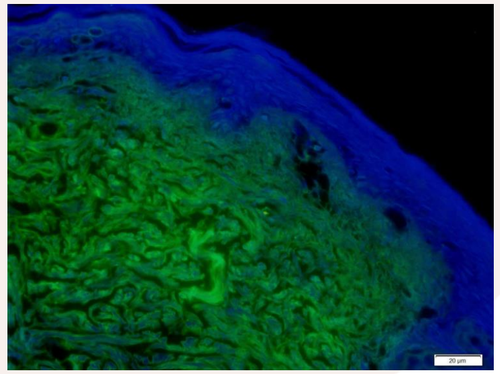
Skin biopsies were submitted to histological procedures and immunostained with specific antibodies against the **biomarkers**.

Skin biopsies (2mm punch) were collected on days 0, 7, 14 and 28 after home use of F4565.33367.200.1.

NRF2, SOD, CAT, GPx, pCOL1

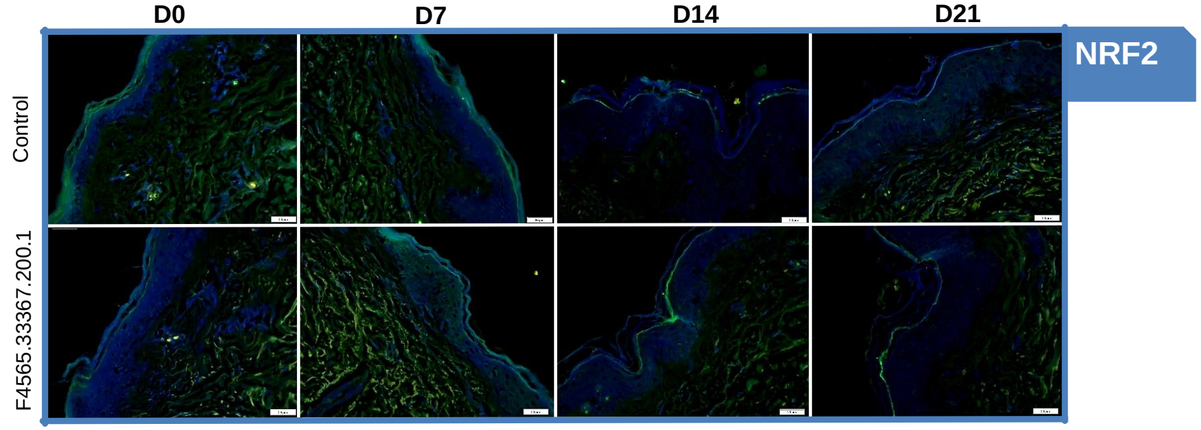
Images were obtained and fluorescence intensity was semi-quantified (arbitrary units – A.U.) using ImageJ software.

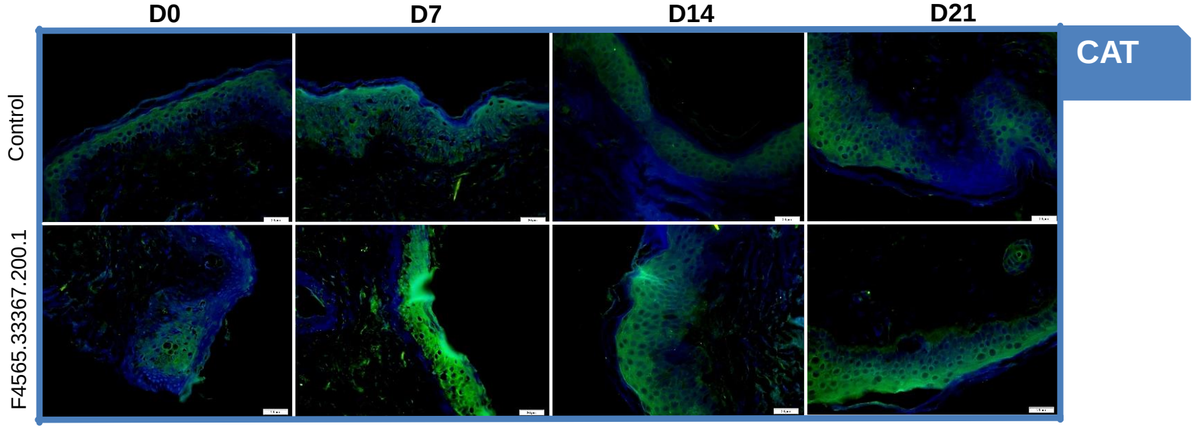


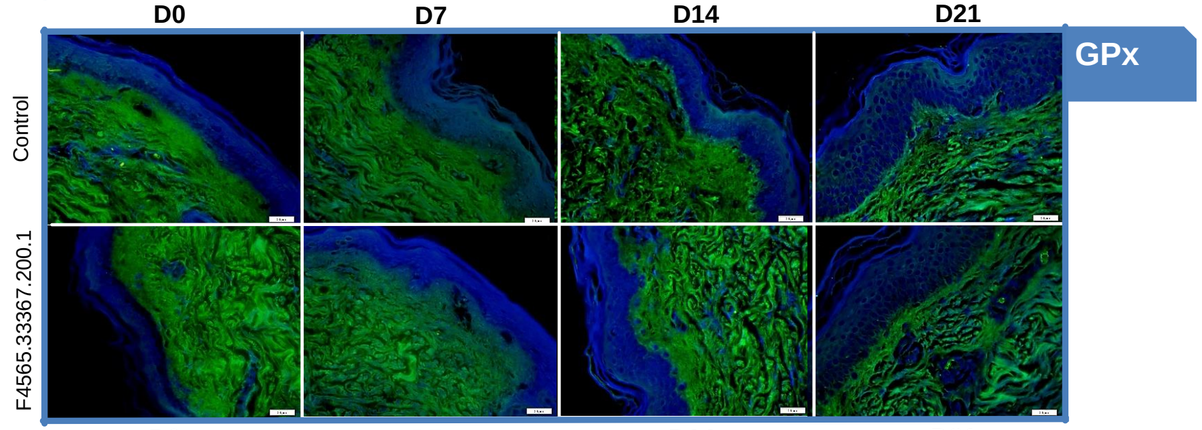


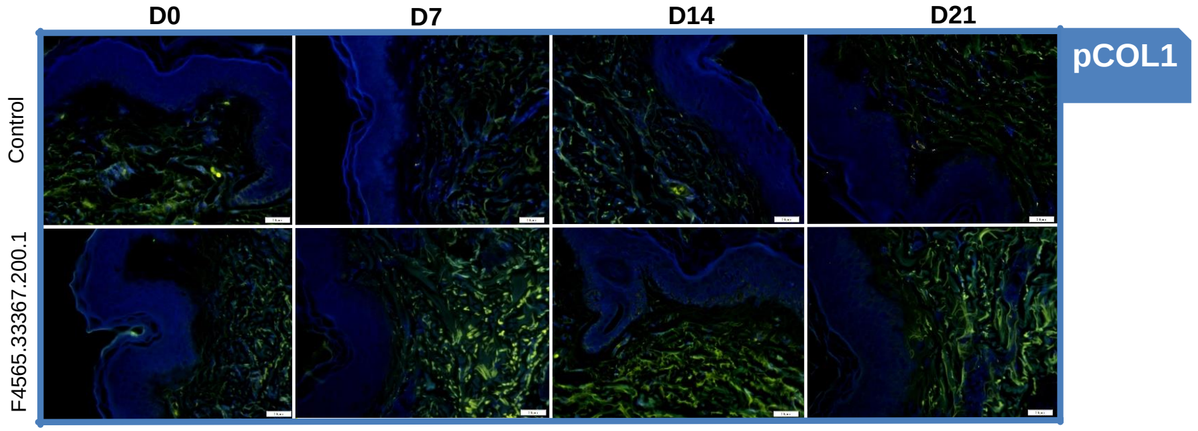
*Lei BUW, Prow TW. Biomed Microdevices. 2019;21(4):81.*

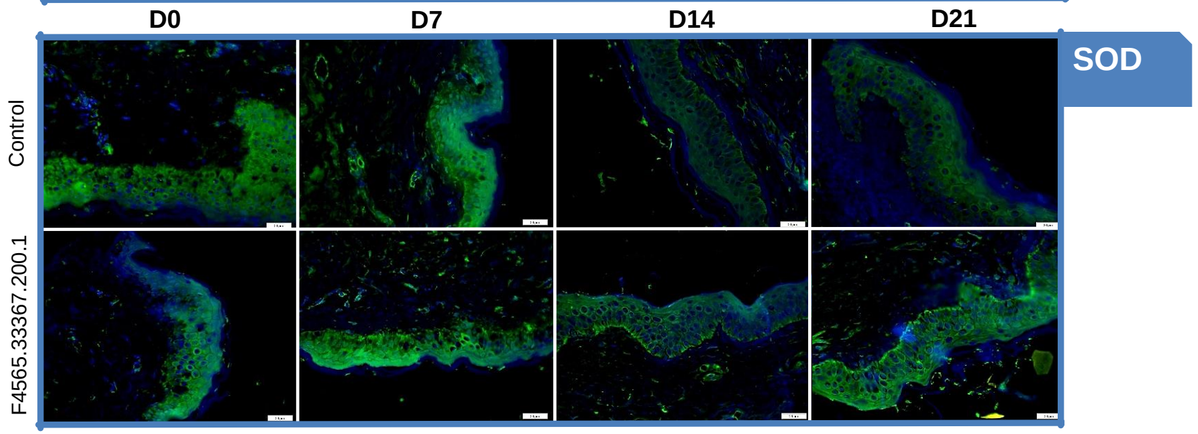
# RESULTS



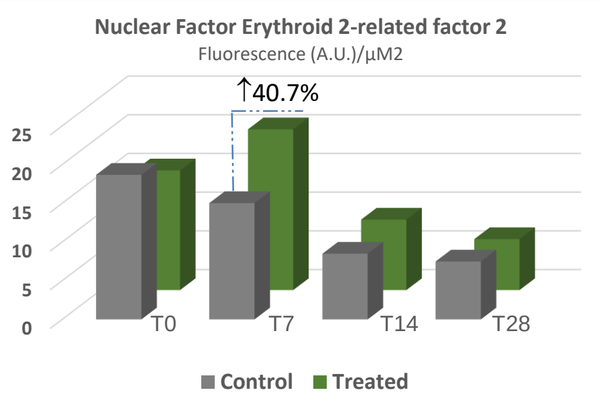



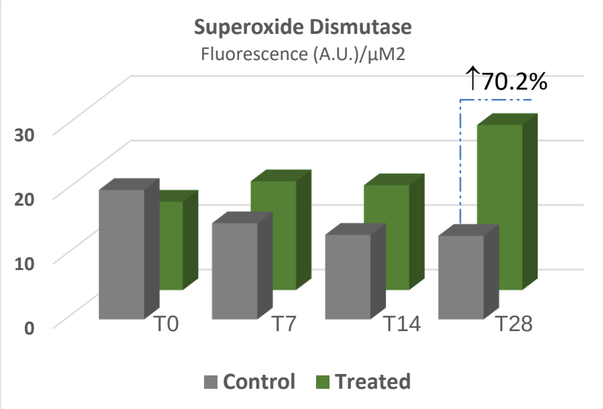



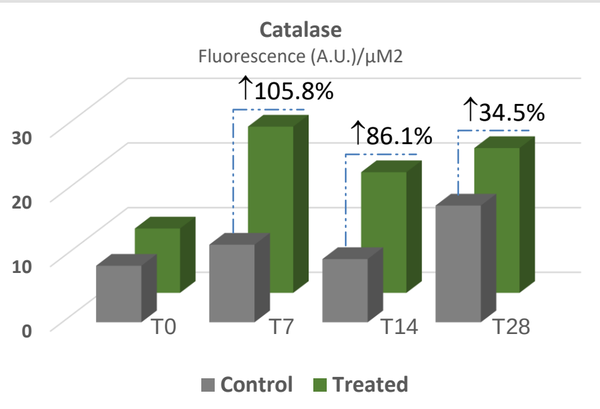



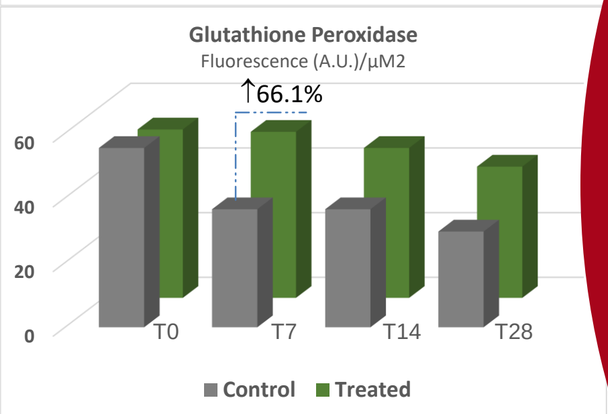

Evaluation of immunofluorescence of **NRF2, SOD, CAT, GPx and procollagen type I** synthesis in biopsies obtained from clinical treatment with **F4565.33367.200.1**. Biomarkers are labeled in green and the blue label represents the nucleus of the cell (DNA). The reference bar corresponds to 20 µm.

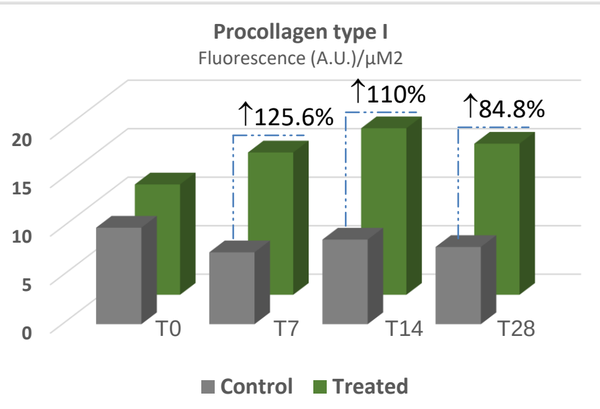
# CONCLUSION




Semi-quantification of the fluorescence intensity of biomarkers after treatment with **F4565.33367.200.1**. The formulation promoted, in relation to respective control, increase of:

- NRF2 → 40.7% in T7;
- SOD → 70.2 in T28),
- CAT → 105.8% in T7, 86.1 in T14, 34.5% in T28;
- GPX → 66.1% in T7;
- pCOL1 → 125.6% in T7, 110% in T14, 84.8% in T28.

- Skin biopsies are invaluable tool in dermatology, offering numerous advantages including accurate research in pharmacology.
- Using this technique, we prove the antioxidant mechanisms of **F4565.33367.200.1** increasing the availability of NRF2, SOD, CAT, GPx, and consequently protecting procollagen type I.
- These results make a valuable contribution to proving the benefits of **F4565.33367.200.1** formulation, mitigating the daily oxidative damage to which the skin is exposed.